

Ammonium Nitrate

**Material Safety Data Sheet
MSDS STL - 01 v.3.1**

Last Revision Date: 31/07/2017

SECTION 1: IDENTIFICATION

Product Name:	Ammonium Nitrate
Other Names and Synonyms:	AN, LDAN, Low Density Ammonium Nitrate, PPAN, Porous Prilled Ammonium Nitrate, TGAN, Technical Grade Ammonium Nitrate, EGAN, Explosive Grade Ammonium Nitrate
Intended Use:	As an ingredient of commercial explosives and blasting agents
Intended Users:	For use only by qualified personnel, fully trained in the handling and use of this product, only under strictly controlled conditions.
Name, Address, and Telephone of the Responsible Party:	Smartchem Technologies Ltd. Sai Hira, Survey No. 93, Mundhwa, Pune – 411 036 Maharashtra, India
In Case of Emergency Call:	
DOMESTIC	20 6645 8088 / 20 6645 8000
INTERNATIONAL	+91 20 6645 8000

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture:

Hazard Class	Hazard Statement	Statement Code	Hazard Category
Oxidizing Solid	May intensify fire; oxidizer	H272	3
Acute Oral Toxicity	May be harmful if swallowed	H303	5
Skin Corrosion / Irritation	Causes skin irritation	H315	2
Serious eye damage / Eye irritation	Causes eye irritation	H319	2 A
Specific target organ toxicity, single exposure / Respiratory tract irritation	May cause respiratory irritation	H335	3

Label Elements



Signal Word: "Warning"

Precautionary Statements

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Do not breathe dust or fumes.
Wear eye protection, protective gloves recommended.

IF SWALLOWED: Get immediate medical attention. DO NOT induce vomiting.
IF ON SKIN: Wash contact area with soap and water. If irritation occurs, get medical attention.
Take off contaminated clothing and wash before reuse.
IF INHALED: Remove person to fresh air. Keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical attention.
IF CONCERNED... ... or you do not feel well: Get medical attention.

Prevention

P210 Keep away from heat.
P220 Store away from clothing, incompatible materials and combustible materials.
P221 Take any precaution to avoid mixing with combustibles and incompatible materials.
P264 Wash thoroughly after handling.
P280 Wear eye protection.

Response

IF IN EYES: P305
P351 Rinse cautiously with water for several minutes.
P338 Remove contact lenses, if present and easy to do. Continue rinsing.
P337 If eye irritation persists: P313-a, Get medical attention.

IN CASE OF FIRE P370
P378-b Use flooding quantities of water to extinguish.

Storage

No storage statements.
Recommendation: Store locked-up in a ventilated space, in accordance with all local applicable regulations.

Disposal

P501 Dispose of contents/container in accordance with all applicable regulations.

Other Hazards

In case of fire: Extreme risk of explosion, evacuate area.
Exposure reaction may be aggravated for those with pre-existing eye, skin, or respiratory conditions.
Causes methemoglobinemia: decreases the blood's ability to carry oxygen and results in symptoms such as dizziness, drowsiness, headache, shortness of breath, blue skin and lips, rapid heart rate, unconsciousness and possibly death.

Unknown Acute Toxicity: Not available

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Components (Name)	CAS Number	Proportion (% w/w)	Hazard Code
Ammonium nitrate	CAS No. 6484-52-2	98 - 100	H272, H319
Other Minor Ingredients	-	0 - 2	-

SECTION 4: FIRST AID MEASURES

- General:** Never give anything by mouth to an unconscious person. If you feel unwell, get medical attention. Show the label where possible.
- Inhalation:** Remove victim from area of exposure. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. When symptoms occur, as difficult breathing or some bluish skin discolouration (cyanosis): move to open air, keep at rest and in a comfortable position for breathing, ensure airways are clear of any obstruction. Apply artificial respiration if patient is not breathing. Get medical advice and attention.
- Skin Contact:** Remove contaminated clothing. Wash contact areas with soap and water. If irritation occurs seek medical advice. Wash contaminated clothing before reuse.
- Eye Contact:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. Get medical attention if irritation persists.
- Ingestion:** Rinse mouth with water. If swallowed, DO NOT induce vomiting: give water to drink. Get medical attention.

MOST IMPORTANT SYMPTOMS AND EFFECTS (ACUTE AND/OR DELAYED):

- Inhalation:** May cause irritation to the respiratory tract, symptoms include: sneezing, coughing, burning sensation of throat with constricting sensation of the larynx and difficulty in breathing.
- Skin Contact:** May cause mild skin irritation. Symptoms may include: redness, pain, swelling, itching, burning, dryness and dermatitis. May cause a more severe irritation or allergic reaction in sensitive individuals.
- Eye Contact:** May cause serious eye irritation. Symptoms may include redness, pain, swelling, itching, burning, tearing and blurred vision.
- Ingestion:** Ammonium nitrate ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by blue lips, tongue and mucous membranes, with skin colour being slate grey. Further manifestation is characterized by headache, weakness, dyspnoea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly shock.

Chronic Symptoms: May cause irritation to the respiratory tract.

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED:

If exposed, concerned or person does not feel well, get medical attention.

Treat symptomatically as for exposure to nitrates (methemoglobinemia), if symptoms such as headache, dizziness, weakness, marked hypotension and dyspnoea appear.

Treatment:

1. Give 100% oxygen.
2. In cases of:
 - (a) ingestion: use gastric lavage;
 - (b) contamination of skin (burnt or unburnt): continue washing to remove salt.
3. Observe blood pressure and treat hypotension if necessary.
4. When methaemoglobin concentrations exceed 40% or when symptoms are present, give methylene blue 1 to 2 mg/kg body weight in a 1% solution by slow intravenous injection. If cyanosis has not resolved within one hour a second dose of 2 mg/kg body weight may be given. The total dose should not exceed 7 mg/kg body weight as unwanted effects such as dyspnoea, chest pain, vomiting, diarrhoea, mental confusion and cyanosis may occur. (Without treatment methaemoglobin levels of 20-30% revert to normal within 2-3 days).
5. Bed rest is required for methaemoglobin levels more than 40%.
6. Continue to monitor and give oxygen for at least two hours after treatment with methylene blue.
7. Consider transfer to medical centre where hemoperfusion can be performed to remove the nitrates from the blood if the condition of the patient is unstable.

Notes: Effects from exposure to decomposition products including nitrogen dioxide (possible decomposition component of blasting fumes) can include chest discomfort, shortness of breath and possible pulmonary oedema, the onset of which may be delayed. The exposed person should be kept under medical surveillance for 24 hours for delayed onset of pulmonary oedema.

Further observation for 2-3 weeks may be required to detect the onset of the inflammatory changes of bronchiolitis.

SECTION 5: FIRE FIGHTING MEASURES

Warning: DO NOT fight fires directly involving Ammonium Nitrate.

There is an extreme risk that ammonium nitrate involved in a fire may detonate, especially if confined and/or contaminated.

- Evacuate the area in all directions for one (1) kilometre or more if any amount of ammonium nitrate is involved in a fire.
- Evacuation is recommended if the initial (incipient) fire, not involving ammonium nitrate, becomes intense.
- General extinguishers may be used on the initial fire, not involving ammonium nitrate, such as electrical equipment fires, tire fires or a general plant fire.
- Water may be used to cool ammonium nitrate not involved in the initial fire.

Flammability Classification: Non-flammable.

EXTINGUISHING MEDIA

Suitable Extinguishing Media: Water spray, coarse or fine, in large quantity. Only water must be used on fires involving ammonium nitrate.
General extinguishers may be used on fires involving only a minimum amount of ammonium nitrate.

Unsuitable Extinguishing Media: DO NOT USE Carbon dioxide nor dry chemical powder.
For fires near ammonium nitrate, dry chemical, foams, steam and smothering devices are not effective, can lead to possible explosion and must not be used.

SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Fire Hazard: There is an extreme risk that ammonium nitrate involved in a fire may detonate, especially if contaminated or confined.

Ammonium Nitrate is non-flammable and not a combustible itself, but will support combustion in an existing fire by liberating oxygen, even if smothered, which will increase the intensity of a fire, even in the absence of air.

Decomposes on heating, emitting irritating white and/or brown fumes (NO_x). Brown fumes indicate the presence of toxic oxides of nitrogen.

ADVICE FOR FIREFIGHTERS

Precautionary Measures: It is recommended that the amount and location of ammonium nitrate stored near a fire be determined prior to committing firefighters to fight the fire.

Firefighting Instructions: When fighting the initial fire, not involving ammonium nitrate, firefighters should follow standard firefighting procedures for the materials involved. Cool containing vessels with flooding quantities of sprayed water until well after fire is out. A self-contained breathing apparatus should be used to avoid inhalation of toxic fumes. Evacuate area and fight fire from a safe distance.

Hazardous Combustion Products: No unusual combustion products are expected. However, toxic fumes will be present.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

General Measures: Contact the manufacturer or dealer, whenever is possible.
Shut off all possible sources of ignition.
No smoking, open flames or flame/spark producing items in the area.
Clear area of all unprotected personnel.
Do not allow the product to mix with combustible/organic materials.
Do not allow container or product to get into drains, sewers, streams or ponds. If contamination of sewers or waterways has occurred advise local emergency services.

FOR NON-EMERGENCY PERSONNEL

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Isolate the area from unnecessary personnel.
Evacuate to a distance of at least 1000 m (1 Km).

FOR EMERGENCY PERSONNEL

Protective Equipment: Provide clean-up crew with proper personal protection equipment (PPE).

Emergency Procedures: Stop the discharge if safe to do so.
Ventilate area.

Environmental Precautions: Avoid release to the environment.

METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Small Spills: Clean-up spillages immediately.
Collect and seal in properly labelled containers or drums for disposal. Do not return spilled material to original container.
Recover and recycle if possible.

Containment: Contain spilled material. Ensure that the spilled material does not run-off into sewers, wells or watercourses. Product will promote algae growth which may degrade water quality and taste.

Clean up and disposal: Use appropriate tools to put the spilled material in a convenient container for disposal.
Sweep or vacuum up, avoiding generating dust.
Ensure that contaminated material (clothing, pallets) is thoroughly washed.
Ensure disposal complies with local regulations. Spillage loss and recovery need to be appropriately documented and material accurately accounted for.
Contact manufacturer.

SECTION 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

Handling Precautions Keep away from sources of ignition and incompatible material such as reducing agents, or combustible materials.
Take precautions against electrostatic discharges.
Avoid contact with skin and eyes.
Do not breathe fumes or vapours.
Keep out of reach of children.

Additional Hazards when the material is processed: Any proposed use of this product in elevated temperature processes should be thoroughly evaluated to assure that safe operating conditions are established and maintained.

A "hot work" procedure must be used when performing hot work on ammonium nitrate process, transportation and handling equipment, storage areas or containers.

Hygiene Measures:

Handle in accordance with good industrial hygiene and safety practices. Thoroughly wash hands and other exposed areas with soap and water before eating or drinking, and again when leaving work. Wash contaminated clothing before reuse.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES
Storage Requirements

Store in a cool, dry, well ventilated place, out of direct sunlight and separate from combustible, organic or other readily oxidizable material.

If ammonium nitrate is to be stored in bulk, the surface must be treated so that it is resistant to attack and penetration. Bulk ammonium nitrate should not be stored on a bituminous floor. Concrete floors are recommended for storage.

Areas of possible confinement should be eliminated to prevent entrapment of material or eventual molten ammonium nitrate to flow during a fire.

Technical Measures:

Store away from sources of heat or ignition. May be corrosive to metals. Smoking, open flames, and unauthorized sparking or flame-producing devices are prohibited.

Ensure that ammonium nitrate is stored securely and in accordance with local regulations.

Storage Conditions:

Storage areas should be inspected regularly by an individual trained to identify potential hazards and ensure that all safety and security control measures are being properly implemented.

All ammonium nitrate storage sites must comply with local regulations.

Incompatible Materials:

Avoid contamination with combustible or flammable materials, strong acids, strong bases, strong oxidizing agents, reducing agents, chlorinated compounds (chlorates, chlorides), permanganates, peroxides, metal powders and copper and any copper-alloys like bronze and brass.

Special Rules on Packaging:

Packaging in accordance with local regulations.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION
OCCUPATIONAL EXPOSURE LIMITS:

Ammonium Nitrate, CAS No. 6484-52-2		
USA ACGIH (nuisance dust)	ACGIH TWA (mg/m ³)	10 mg/m ³ – Inhalable particulate
USA OSHA (nuisance dust)	OSHA PEL (TWA) (mg/m ³)	5 mg/m ³ – Respirable (particulate)

EXPOSURE CONTROLS

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Provide ventilation for nuisance dust protection and use process enclosures, local exhaust ventilation or other engineering controls to keep airborne levels below recommended exposure limits (TLV/PEL).

Emergency eye wash fountains and safety showers are not required, but should be available in the vicinity of any potential exposure.

PERSONAL PROTECTIVE EQUIPMENT
Hands / Skin Protection:

Chemically resistant gloves are recommended, but not required. Where skin contact may occur because of prolonged or repeated exposures, wear long sleeved clothing or coveralls.

Eye Protection:

Safety glasses with side shields or safety goggles.

Respiratory Protection:

Approved respiratory protection, with dust, mist or fume filters, should be worn when recommended by a risk assessment or if irritation is experienced.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

INFORMATION ON PHYSICAL AND CHEMICAL PROPERTIES:

Molecular Formula:	NH ₄ NO ₃	
Molecular Weight:	80.04	
Appearance:	Solid white to off-white granules	
Odour:	Negligible	
Odour threshold:	Not relevant	
Vapor density:	Not relevant	
pH:	Not relevant	(Typically 4.5 – 6.5 in 10% w/w aq. solution @ 25 °C)
Melting point:	169.6 °C (337.3 °F)	(Initial boiling point and boiling range not available)
Critical Temperature:	Not available	
Decomposition Temperature:	210 °C (410 °F)	
Autoignition Temperature:	Not available	
Flash point:	Not relevant	
Evaporation rate:	Not relevant	
Flammability:	Will not burn	
Upper / lower flammability or explosive limits:	Not available	
Vapor pressure:	Not applicable	
Volatility:	Not available	
Bulk Density:	0.70 – 0.95 g/cc (42 - 59 lb/cf)	
Specific Gravity:	1.725 (water = 1)	
Viscosity:	Not available	
Solubility:	Easily soluble in water. Soluble in acetone. Partially soluble in methanol. Insoluble in diethyl ether.	
Solubility (in water):	118 g/100 ml @ 0 °C (32 °F) 190 g/100 ml @ 20 °C (68 °F)	
Partition coefficient; n-octol/water:	Not available	
Auto-ignition temperature:	Not available	
Boiling Point:	Decomposes at 210 – 212 °C (410 - 414 °F)	
Explosive properties:	Mass detonation hazard when involved in a fire	
Explosion Data – Sensitivity to Mechanical Impact:	Not sensitive to mechanical impact	
Explosion Data – Sensitivity to Static Discharge:	Not sensitive to static discharge	

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability:	Stable under normal conditions of transportation, storage, handling and use. Highly hygroscopic: absorbs moisture from surrounding air. May explode under high confinement and high temperature, but not readily detonated. May explode due to nearby detonations.
Chemical Reactivity:	Powerful oxidising agent. Non-reactive under normal conditions of transportation, storage, handling and use.
Possibility of Hazardous Reactions:	Polymerization will not occur.
Conditions to Avoid:	Exposure to heat, sources of ignition, open flame and elevated temperatures.
Incompatible Materials:	Avoid contamination with combustible or flammable materials, strong acids, strong bases, strong oxidizing agents, reducing agents, chlorinated compounds, bromates, permanganate, peroxides, metal powders, zinc, copper and any copper alloy like bronze and brass.
Hazardous Decomposition Products:	None under normal processing. No unusual fumes or decomposition products expected, however, toxic nitrogen oxides (NO _x) and ammonia will appear near decomposition temperature.

SECTION 11: TOXICOLOGY INFORMATION

Acute Toxicity: (See Section 2)

LD50 and LC50 Data:

Ammonium Nitrate, CAS No. 6484-52-2		
Oral LD50	2,217	mg/kg of body weight (Rat)
Inhalation LC50	> 88.8	mg/l/ (Rat) 4 h

Skin Corrosion/Irritation:	May cause skin irritation
Eye Damage/Irritation:	May cause serious eye irritation
Respiratory:	Not classified. Not known to be a respiratory sensitizer. Breathing dust may result in respiratory irritation.
Skin Sensitization:	Not classified. Not known to be a skin sensitizer. Can be absorbed through cut, broken or burnt skin with possible adverse effects. Repeated or prolonged skin contact may lead to irritation.
Germ Cell Mutagenicity:	Not classified
Teratogenicity:	Not available
Carcinogenicity:	Not classified
Reproductive Toxicity:	Not classified
Specific Target Organ Toxicity:	May cause drowsiness or dizziness (single exposure)
Specific Target Organ Toxicity:	Not classified (repeated exposure)
Aspiration Hazard:	Not classified
Symptoms/Injuries after Inhalation:	Harmful if inhaled, causes methemoglobinemia. Symptoms may include headache, dizziness, nausea and a loss of coordination.
Symptoms/Injuries after Skin Contact:	May cause mild skin irritation. Symptoms may include: redness, pain, swelling, itching, burning, dryness and dermatitis. May cause a more severe or allergic reaction in sensitive individuals.
Symptoms/Injuries after Eye Contact:	May cause serious eye irritation. Symptoms may include redness, pain, swelling, itching, burning, tearing and blurred vision.
Symptoms/Injuries after Ingestion:	Burning sensation. Abdominal pain. Abdominal cramps. Vomiting. Ammonium nitrate ingestion may cause methemoglobinemia.
Chronic Symptoms:	Although none are expected under normal conditions, frequent inhalation exposure may cause methemoglobinemia and may damage respiratory tract.

SECTION 12: ECOLOGY INFORMATION

Ecotoxicity	Avoid contaminating waterways. Ammonium nitrate is a plant nutrient. Can stimulate algae and weed growth. Large scale contamination may kill vegetation and cause oxygen-poisoning in livestock and poultry. Low toxicity to aquatic life, due to its high solubility and biodegradability.
Persistency / Degradability	Biodegradable. Not expected to accumulate or bio-concentrate. May leach or disperse in soil due to its high-water solubility.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal: Recover and place material in a suitable container for intended use or disposal. Dispose of contents and container in accordance with local regulations.
Recycle to process, if possible and approved by the corresponding authorities / inspectorate / regulators.
Clean non-contaminated waste ammonium nitrate may be disposed of as a fertiliser, needing adequate approval from authorities.
Ensure disposal complies with government requirements and local regulations.
Empty containers must be either rendered totally unusable, or if to be recycled for use, decontaminated by thoroughly rinsing with water. Rinsing water must be carefully disposed of.
All Ammonium Nitrate disposal of material must be appropriately documented and the material accurately accounted for.
Call manufacturer or dealer.

SECTION 14: TRANSPORTATION INFORMATION

Product Classification Ammonium Nitrate is classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.
For Air (IATA, International Air Transport Association) transport the same regulations are applicable.
For Road and Rail transport the same regulations are generally enforced by regional, national and/or local authorities.

Shipping Information

UN No:	1942
Hazard Class:	5.1 Oxidizing Agent
Packing Group:	III
Proper Shipping Name:	AMMONIUM NITRATE
Technical Name:	AMMONIUM NITRATE
Description:	Ammonium nitrate, with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substance.



Marine Transport

IMDG EMS Fire: F-H
IMDG EMS Spill: S-Q

SECTION 15: REGULATORY INFORMATION

Classification:

This material is hazardous according to generally accepted international regulations and commercial agreements. Designed as HAZARDOUS CHEMICAL.

Classification of the chemical: See Section 14
Hazard Statement(s): See Section 2
Poisons Schedule (SUSMP): None allocated

Various regulations/controls/authorisations/licences may apply governing the manufacture, importation, exportation, use, handling, storage, sale/supply, transport and disposal of ammonium nitrate. Record keeping and licensing of individuals shall be required and maintained.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF LAST REVISION

This MSDS was prepared by Smartchem Technologies Ltd., headquarters in Pune, Maharashtra, India, based on the best information available at the moment of the last revision, and in accordance with the current national regulations when applicable.

This information is based on Smartchem Technologies Ltd. Company's best knowledge at the date of issue and is intended to describe the product for the purposes of health and safety requirements only. It should not be construed as guaranteeing any specific property of the product.

Since the manufacturer / supplier cannot anticipate or control the conditions under which the product may be used, each user must, prior to handling and usage, assess and control the risks arising from its use of the material.

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Last Revision Date: 27/July/2017

Revision Version: 2017-03

DISCLAIMER

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